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ABSTRACT

Compiled in this newsletter are activities, viewpoints, reports, book reviews, and conference proceedings emanating from the International Union for Conservation of Nature and Natural Resources (IUCN). Principle items deal with viewpoints of politics and conservation and the International Workshop on Environmental Studies in Higher Education and Teacher Training held at Althouse College of Education, London, Ontario, Canada, September, 1972. The first considers the technique of questioning political candidates by the electorate in an effort to get their opinions or stand on conservation issues. An abridged questionnaire used by the Venezuelan Society of Natural Sciences for this purpose is reproduced and searches the areas of population and economic growth, economic development and conservation, pollution, protection of natural areas, administration of resources, and natural areas, tourists and recreation. The latter item presents conclusions from the International Workshop which stress developments needed in the field of decision-making on issues dealing with environmental education for three areas: higher education, teacher education and professional fields. Additional Bulletin items include recommendations for a crocodile saving program; conservation meetings; a list of the largest national parks of the world; World Wildlife Fund news; six book reviews; and miscellaneous notes. (BL)

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IUCN Viewpoint

Politics and Conservation

Environmental issues are prominently the substance of politics these days and have been the turning point in electoral campaigns in many countries.

This reflects the growing public awareness of conservation, and the impact that questions affecting the quality of life are now making at all levels.

Conservation organizations have worked hard to have their viewpoint accepted by the community at large. The fight for recognition of ecological principles as the basis for decision-making continues and often provokes a backlash.

The intrusion of conservation objectives and the science supporting them into the political arena has been resented both by entrenched interests and by politicians. Nevertheless, progress has been made and the Stockholm Conference – where global aspects of environmental problems were recognized by governments as subjects for international action – was a turning point in decision-making, despite the stir of conflicting views that often clouded the principal objective.

In recent elections in several countries the conservation "record" of candidates has been called to account. In the Soviet Union, changes in personnel in high administrative positions have been made because of "negligence" in safeguarding the environment.

This questioning on the part of the electorate of the conservation awareness of potential decision-makers is a healthy sign. The conservation community should use this technique as part of its campaign to bring environmental issues squarely before national leaders and the people.

One of the most recent and worthwhile efforts has been carried out by the Venezuelan Society of Natural Sciences (an applicant for membership in IUCN) which has an admirable record of promotion of natural sciences and conservation action in Venezuela. It recently submitted the following questionnaire (here translated and slightly abridged) to the Presidential candidates in the forthcoming December 1973 elections in an effort to get their opinions or their "stand" on conservation issues on the record.

IUCN believes efforts of this kind are very useful and the questionnaire is reproduced as an example of one way to involve present and potential decision-makers in the cause of conservation.

Questionnaire submitted to Presidential candidates in Venezuela:

1. Population and economic growth

The population growth rate of Venezuela (about 3.4 % annually) is one of the highest of the world. According to many scientists and some international organizations, such a growth rate for a developing country can be a serious obstacle to reaching the outlined goals of development.

Do you feel this appreciation is correct and the situation is valid for Venezuela?

Would you promote a population policy that would reduce our population growth rate?

2. Economic development and conservation

In some countries politicians are striving to accelerate development by all possible means. However, it is quite clear from examples throughout the world that such efforts often lead to accelerated reduction and harm to natural resources as well as the deterioration of the environment, lowering the collective welfare.

How do you propose that the apparently opposite interests of development and conservation can be reconciled in the following:

a) Food and agriculture development,
b) Opening of the hinterland,
c) Industrialization,
d) Urbanization.

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INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES
1110 MORGES SWITZERLAND

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Do you feel that land-use planning and exploitation of natural resources must be based on strictly economic criteria?

3. Pollution

An important country of this hemisphere advocates economic development of emerging countries even if this means a lowering of environmental quality.

Do you agree with such policy?

If not, would you support legislation that would oblige polluting industries to absorb the costs of preventing and controlling pollution generated by them and to repair the environmental damage they have caused?

Would you allow foreign industries such as pesticides manufacturers to establish industrial complexes in Venezuela if their products have been banned in their home countries?

4. Protection of natural areas

What are your plans to develop, expand and protect natural areas for such purposes as National Parks and other protected areas?

What measures would your government take to restore the coastal and insular areas to a condition that would make them more compatible with uses that would benefit a majority of people, instead of the destructive ways presently going on in spite of the existing legal restrictions?

Would you subscribe to international agreements to control and, if necessary, prohibit commercial traffic in endangered animals, plants and their products?

Do you think a policy of "presence along our borders" through an active colonization programme should be carried out, even if it is well known that this will be done with great sacrifices to our natural environment?

5. Administration of resources

What administrative reforms would you envisage to cope with the environmental crisis?

How do you intend to avoid duplication and dispersion?

Would you envisage the creation of an advisory group to assess the ecological impact of any large development project (dams, road opening, large-scale colonization, irrigation, etc.)?

6. Natural areas, tourists and recreation

In view of the need to ensure much larger recreation areas, what are your plans in relation to providing more open air spaces and better mass tourism facilities?

• • •

Clearly, as long as conservation is concerned with natural resources and their use, conservationists will be deeply involved with the entire range of decision-makers: economic, social and political. Natural resources are the stuff of life to the majority of the world's people as well as the key to wealth for others. This is an oversimplification, perhaps, but no one who understands these values can remain neutral . . . and least of all, the conservation community.

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Programme Activities

Experts call for broad programme to save crocodiles

A 5-point programme for conservation of the world's crocodilian reptiles has been recommended by the Crocodile Specialist Group of the Survival Service Commission. The Group met 20–27 March at Ndumu and St. Lucia Game Reserves, Zululand. The new programme is aimed principally at saving 9 species: Cuban crocodile, Orinoco crocodile, Morelet's crocodile, Siamese crocodile, Indian gavial, false gavial, Rio Apaporis caiman, broad-nosed caiman and Chaco broad-nosed caiman. All are classified in the endangered category, and will be so listed in the revised Red Data Book, Vol. 3. A number of other crocodilians are in lesser categories of danger.

The action programme outlined by the Specialist Group includes the following elements:

- surveys of hide sources, their volume and flow worldwide;
- surveys of wild populations of crocodilians with emphasis on South East Asia, West Africa and South America;
- specific actions favouring the species currently on the verge of extinction;
- focusing worldwide attention on crocodilian ecology;
- promotion of the establishment of an adequate system of sanctuaries for all species.

The order Crocodylia as the whole is in serious trouble. Essentially they are inhabitants of restricted areas; they do not migrate and their conservation is a local and national problem.

The main cause of their rapid and dangerous decline in recent years has been the uncontrolled killing of these animals for the leather trade. Hitherto, rational management has been the exception rather than the rule and, in some countries, crocodiles are unfortunately still classed as "vermin". As a result, some 15 out of the 21 existing species are already considered by the SSC as seriously threatened.

The crocodilians represent a valuable national asset of many countries, both as a tourist attraction and as a source of high-grade leather available for exploitation on a strictly limited and rational basis. Like other predators and scavengers they also play an important part in maintaining the balance of nature in relation to fresh water ecology. Furthermore, the crocodilians are of immense scientific interest as the only surviving members of the archosaurian group of reptiles which dominated the earth for 100 million years.

The meeting was financed in large part by the New York Zoological Society. It was hosted by the Natal Parks Game and Fish Preservation Board. The meeting was organized by IUCN and WWF.

Conservation Notes

Two meetings in Europe on environmental issues

Two major policy meetings concerned with environmental affairs affecting the European region took place recently.

The Council of Europe Ministers for the Environment met in Vienna, Austria, on 28–30 March 1973. They approved a programme for co-operation in management of the environment and recommended its adoption to the Council of Ministers. Conservation of wildlife and environmental education formed key elements of this programme.

Senior Advisers to ECE Governments on Environmental Problems met in Geneva on 2–6 April 1973. They examined environmental issues of major importance to governments participating in the Economic Commission for Europe, and adopted a programme of work and priorities. In contrast to the Vienna meeting, much emphasis was placed on pollution and urban issues.

These meetings were welcomed by the Executive Director of the UN Enyironmental Programme as representing the first regional follow-up on the Stockholm Conference Action Plan.

The largest national parks of the world (over 10,000 sq km)

According to the 1973 UN List of National Parks and Equivalent Reserves, the largest "national parks" of the world are:

1.	Wood Buffalo	Canada	44,807 sq km
2.	Gemsbok	Botswana	24,800 sq km
3.	Salonga	Zaïre	22,400 sq km
4.	Kafue	Zambia	22,400 sq km
5.	Etosha	South West Africa	22,270 sq km
6.	Tsavo	Kenya	20,800 sq km
7.	Kruger	South Africa	19,485 sq km
8.	Wankie	Rhodesia	14,432 sq km
9.	Manu	Peru	14,000 sq km
10.	Serengeti	Tanzania	12,950 sq km
11.	Fiordland	New Zealand	12,236 sq km
12.	Komoe	Ivory Coast	11,500 sq km
13.	Ruaha	Tanzania	11,500 sq km
14.	Jasper	Canada	10,870 sq km
15.	Chobe	Botswana	10,360 sq km
16.	Canaima	Venezuela	10,000 sq km
17.	Bamingui-Bangoran	Central African Republic	10,000 sq km

Although the largest national park of the world is now in Canada, twelve of the seventeen parks listed above are in Africa.

Among the other reserves included in the 1973 UN List, the following cover more than 10,000 sq km:

1.	Ouadi Rimé Ouadi Achim Faunal Reserve	Chad	48,925 sq km
2.	Arctic National Wildlife Refuge	U.S.A.	34,600 sq km
3.	Unnamed conservation park	Southern Australia	21,300 sq km
4.	Katmai National Monument	U.S.A.	10,790 sq km

However, the largest protected area of the world is a nature reserve in Botswana: Central Kalahari Game Reserve, which covers 52,800 sq km and is not open to the public. Bushmen hunter-gatherers live their traditional way of life in this reserve.

Blue Lagoon National Park, Zambia

The Government of Zambia in February declared its eighteenth national park: Blue Lagoon National Park. It is located some 130 km west of Lusaka, in the Kafue Flats area on the north side of the Kafue river. The new national park was previously a private cattle ranch, and covers 45,000 ha of what was once a lake bed.

Primary interest is in the specialized flood-plain wildlife habitat, and in particular the large population of lechwe *Kobus lechwe kafuensis*. This subspecies is unique to the Kafue Flats. About 25,000 of them occur seasonally. These flats are very rich in birdlife and about 400 species have been recorded. The area also is a very important feeding ground for waterfowl.

With the addition of the new park, Zambia has brought the total area protected as national parks to nearly 8% of the total territory of the country, a very high ratio.

"You and Your Environment: Priority for Red Cross" is the theme of World Red Cross Day 1973, commemorated on 8 May.

International Union for Conservation of Nature and Natural Resources

International Workshop on Environmental Studies in Higher Education and Teacher Training

held at Althouse College of Education, London, Ontario, Canada
5-7 September 1972

Conclusions

Preamble

This was the first International Workshop convened to examine active environmental education programmes underway in the areas of higher education, teacher training and professional fields.

It was organized by a North American Organizing Committee based at Althouse College of Education, London, Ontario, Canada, in co-operation with the International Union for Conservation of Nature and Natural Resources (IUCN). The Workshop received support from the Conservation Foundation, Washington, USA; the Federal Office of the Secretary of State, Ottawa; the Canadian International Development Agency (CIDA); the World Wildlife Fund (WWF) (Canada); and the Early School Environment Study (supported by the Ford Foundation), London, Canada.

A total of 85 participants from the following countries took part: Australia, Argentina, Bangladesh, Czechoslovakia, Canada, Federal Republic of Germany, France, Great Britain, Greece, Italy, India, Japan, Jamaica, Kenya, Netherlands, Poland, Rwanda, Saudi Arabia, Sweden, Sierra Leone, Switzerland, United States of America, USSR and Zaire. Representatives of five international organizations: Boy Scouts World Bureau, FAO, UNESCO, MAMBO and IUCN, also took part.

Professor Paul B. Park of Canada chaired the Workshop. The emerging theme of the Workshop stressed developments needed in the field of decision-making on issues dealing with environmental education. Working groups focused on the three main divisions of the Workshop and brought forward recommendations for needed action and further discussion.

Participants considered the residential nature of the workshop to be most valuable as providing an opportunity to exchange experiences and information about ongoing development projects. In addition, the working groups brought forward statements, recommendations and unresolved issues for wider distribution. The working group recommendations and further issues follow below.

Working Group I

Environmental programmes in higher education

1. *"Data Bank":* There is an important need for the collection and dissemination of information in environmental education. The Working Group understands that IUCN has a limited programme of this nature underway, but suggests the following needs as guidelines for the expansion of this clearing house operation:

a) Selected discipline material from all countries should be sought, compiled, and made available for distribution. This should also include a listing of colleges, universities, and individuals active in environmental education.

b) A programme of international visits between experts in environmental education would be useful.

c) A periodic newsletter, widely available, would be useful.

2. *Conference on goals and objectives:* It is recommended that the present Workshop be followed by a Working Conference on Goals and Objectives. The Conference should develop specific educational goals for environmental education covering at least two levels:

a) Goals for the education of all citizens, and

b) Goals for the education and training of environmental specialists.

The Conference should be international in nature and emphasize the universality of goals for education – levels of knowledge, skills, awareness, etc. It is hoped that these would be stated specifically, thus permitting effective action for their achievement.

A second and parallel effort of the Conference should be to identify the important unifying themes (energy, the concepts of interlocked systems, etc.) which would be helpful as guidelines in course and curricular development.

It should be made clear that the intent of the Conference would be to identify goals and themes and not to specify educational models, syllabi, etc. It is recognized that there is great diversity in the methods and formats which can be employed to achieve these common goals.

Some examples of "unifying themes" are:

a) Origin and evaluation of man and his environment.

b) The development of natural systems (national self-regulatory processes, e.g. energy, population).

c) The regulation and maintenance of natural systems.

d) The development of social and regional systems.

e) The impact of human cultures on the national system.

Working Group II

Environmental programmes in teacher education

The Working Group commends the IUCN projects on the development of methods handbooks for teachers in environmental and conservation education, and looks forward to their early appearance. It makes the following recommendations relating to this theme:

3. A future working conference should be held to formulate a set of universal environmental concepts, suitable for all educational levels throughout the world, in order to achieve the goals of IUCN.

4. An international exchange of students and faculty members should be promoted.

5. *All* teachers (both *pre-* and *in-service*) should receive experiences which will encourage them to recognize MAN as an environmental factor.

6. Courses dealing with man and his environment should be available to both pre- and in-service teachers.

7. In all courses in environmental education particular emphasis should be given to environmental conservation.

8. Environmental education should reflect an emphasis on empathic relationships among students and teachers.

9. Teachers and prospective teachers should be provided with opportunities to observe and teach in a variety of environments, e.g. classrooms, school grounds, community resource centres, and natural areas. Furthermore, they should be exposed to experiences similar to those they are expected to provide for their children.

10. Teachers should be educated in the effective use of the larger blocks of time required for environmental studies.

11. In the process of teaching environmental education, opportunities should be provided for the development of aesthetic appreciation, the achievement of linguistic effectiveness and sensitivity, the fostering of social feelings, and all

those aspects of personality development which have traditionally been associated with the so-called 'human studies'.

In keeping with the IUCN definition of environmental education, the following recommendations are made:

12. Teachers should be educated in the use of local environmental problems as starting points for study.

13. Courses in environmental education should give attention to techniques of making decisions and solving problems, particularly those of a complex and interdisciplinary nature.

14. Such courses should encourage teachers to create classroom environments in which inquiry can flourish, in which their own and student individuality is respected, where one seeks alternatives as well as answers, and where failure to find solutions is acceptable.

15. In such courses attention should be given to the evaluation of information about environmental problems, particularly its completeness and its validity.

16. Teacher education programmes should include instruction in the design, development and use of environments around the school.

The Working Group recommends that the following be considered by IUCN:

17. Recommendation 2(a) of the European Working Conference on Environmental Conservation Education (Rüschlikon, 1971) should be amended to the following:

The training of teachers should provide them with essential basic knowledge of ecological fact and an adequate background of the *social sciences and their relationships* to human ecology.

18. An environmental programme must be relevant to the community which it serves, through the provision of experiences in the total environment.

19. Teachers, administrators, parents and children should all be involved in the planning, development, implementation and evaluation of the programme.

20. IUCN should establish a committee to seek ways of implementing recommendation 2(e) of the European Working Conference on Environmental Conservation Education (Rüschlikon, 1971), that media banks be established at the national and international level for the exchange of information, training aids and teaching materials.

21. The UN Environment Officer should be advised of the need to establish an international clearing house for the development and distribution of non-print environmental education materials.

22. Letters should be sent by IUCN to university presidents, ministries or departments of education, and other responsible authorities, urging them to adopt the recommendations for environmental education.

The Working Group draws attention to the following three unresolved issues as requiring further study:

23. The development of environmental education curriculum programmes (for ages 5–12) should be considered a new direction or focus for existing subject matter rather than as another subject added to the curriculum.

24. Environmental education, by virtue of its interdisciplinary nature, necessitates a team approach, or at least co-operation amongst subject specialists. (Disagreement centered around the application of this statement at different age levels of schooling.)

25. Time should be made available during regular school hours for in-service environmental education. (Disagreement on this point appeared to be due to differences in attitudes and policy among countries and among educational agencies.)

Working Group III

Environmental programmes in the professional fields

The Working Group reached the following broad conclusions in relation to in-service training:

26. General ecological training, with emphasis on the needs of the specific professions, should be instituted in programmes (*in-training* courses) concerned with urban and rural land-use planning, town planning, architecture, law, public administration, political science, economics, social science, medicine and journalism; and, in particular, courses in environmental conservation and management should be compulsory for all engineers and industrial specialists.

27. Professional workers in these disciplines should periodically receive condensed courses (*in-service* courses) in environmental sciences, and steps should be taken to bring awareness and interest of environmental problems to decision makers.

28. For professional *in-training* courses the following programme should be instituted:

a) Concepts of ecology as they affect the human environment.
b) Techniques of resource inventory.
c) Pollution, its causes, consequences and control.
d) Management and legislative practices.
e) Socio-cultural aspects of the environment.

29. For professional *in-service* training, condensed courses on these topics (28. above), should be developed with emphasis on cross-disciplinary communication. For decision makers there is a need to develop briefing packages consisting of "awareness type" presentations, keyed to specific projects, national and international conferences, and legislation on specific issues such as air or water pollution.

The Working Group proposed the formation of National Environmental Centres as follows:

30. Every nation should develop a National Environmental Centre (or Centres) within one or more Universities, with a team of specialists active in a broad range of disciplines. These centres should operate with as much independence as possible in order to encourage and actively foster teaching and research of an interdisciplinary nature. They should interact with all other units within the University, and maintain close contact with environmental affairs at all levels of the nation's activities. The breadth of disciplines that need to be involved cannot be overemphasized, and their freedom to investigate independently and advise the government, the public and industry on environmental concerns must be ensured.

31. The National Environmental Centres, although essentially academic, would be expected to fulfil a role within the University and in the public and private sectors. They would develop and teach courses at the post-graduate and under-graduate levels, provide public education programmes, develop *in-service* courses and briefing packages on special topics, provide facilities for environmental research, and assist in solving problems in a consultative capacity. The development of courses for public education, information for the communications media, and industrial consultation must be recognized as essential activities of the Centre, and must be implemented at the outset.

32. Such Centres should enjoy international recognition and be given all possible support, particularly in developing countries, in order to allow for the exchange of personnel and ideas more easily.

33. Universities and other institutions should also be encouraged to develop *in-service* programmes, organize study sessions and seminars, conduct research and pursue other activities to promote better understanding and management of the environment.

34. An important role of the National Environment Centre would be the development of long-range forecasting techniques. This would require the compilation of existing data and acquisition of new data on the environment.

The Working Group also made the following additional recommendations:

35. Professional workers, in connection with their professional associations, should be encouraged to involve themselves in environmental education and development of environmental ethics appropriate to their discipline.

36. Information resource centres for their discipline should be set up with feed-back mechanisms to maintain up-to-date sources of information.

37. Research needs, identified by action-oriented professionals, possibly helped by interaction with visiting consultants, and National and International Environment Centres, should be communicated to active researchers for research action.

38. Professional workers, and their professional societies, should be encouraged to include in their conferences and meetings consideration of environmental issues, and in particular the potential environmental consequences of their activities.

39. The importance of the communications media (television, radio, newspapers, etc.) for developing public opinion and awareness, demands that environmental specialists should acquire competence to work with the media, and that the media specialists should develop an understanding of environmental problems and ethics.

40. A series of conferences and workshops should be organized regionally to advance the concepts developed at the United Nations Conference on the Human Environment, and they should be organized to include both national policy makers and representatives of the professions responsible for environmental planning and management.

Canada acquires new national wildlife area

Canada's Minister of the Environment has announced the acquisition of the 1,450 acre Big Creek Marsh on Lake Erie, near Port Rowan, Ontario, as part of its continuing programme to preserve wetlands for waterfowl. The land was bought by the federal government from the Toronto and Big Creek Shooting Club.

The marsh provides food and rest for thousands of ducks during spring and fall migration. In addition, it is a moulting area for ducks in the summer, and a famous resting place for migrating whistling swans in spring.

A management plan regulating use will be developed by the Canadian Wildlife Service and the Ontario Ministry of Natural Resources.

Survey recommends reserve for rare Madagascan tortoise

One of the world's rarest tortoises is *Testudo yniphora*, a Madagascan species believed to number only a dozen or so specimens. In an IUCN/WWF sponsored survey just concluded, Dr. C. P. Blanc of Montpellier, France, an expert on the amphibians and reptiles of Madagascar, estimated about 10 animals exist in the Soalala-Baly Bay area. In addition, an unknown number may be in captivity since local folklore credits the tortoise with power to keep chickens free of diseases.

Dr. Blanc recommends a new reserve be established for the tortoise on Cape Soalala. Any animals found in captivity would be bought and introduced into the reserve.

The tortoises, once abundant, have been gravely reduced by collection and loss of habitat. Although legally protected, their numbers continue to decline as a result of forest burning and collection.

The Kingdom of Norway has notified the Director General of its adherence to the Statutes of the Union, thereby bringing the membership of sovereign states to 31.

Nicholls honored by Thailand

His Majesty the King of Thailand has graciously appointed Mr. Frank G. Nicholls, Deputy Director General, IUCN, as Commander of the Most Noble Order of the Crown of Thailand. The award recognizes his services to science in Thailand, particularly in the establishment and activities of the Applied Scientific Research Corporation of Thailand, principal research agency of the Government of Thailand.

World Wildlife Fund News

WWF grants top $10 million

World Wildlife Fund grants to conservation projects since its foundation in 1961 have now topped ten million dollars. Dr. Fritz Vollmar, Director General of WWF, said the grants have gone to 831 projects throughout the world.

March grants brought the total to over ten million dollars. They included grants to support game wardens in the Simien Mountains National Park in Ethiopia, and the Salonga National Park, Zaire; to provide for the development of the Doñana National Park in Spain, and for maintenance of the Charles Darwin Research Station in the Galapagos Islands, Ecuador. Efforts to save endangered species were represented by grants to projects covering Morelet's crocodile in Mexico; the Houbara bustard in Pakistan; the Sumatran rhinoceros; wild goats, sheep and deer in Afghanistan; the central Indian swamp deer; the bald ibis in Turkey; the white-tailed sea eagle in northern Europe; and the wolf throughout its range. There were grants for educational campaigns to promote conservation of the vicuña in Peru and Bolivia, and of the Galapagos Islands.

The money came from people in all walks of life who have responded to the World Wildlife Fund's campaigns to save endangered wildlife and wild places, thus demonstrating their interest in nature conservation, Dr. Vollmar said.

Staff Notes

Assistant for membership

A special assistant for membership has been appointed within the Secretariat to ensure that IUCN members are given prompt attention in all organizational matters and receive the services to which they are entitled. Miss Estelle Buckley, who has been on the staff for several years, was named to the post at the start of the new year.

Duties include handling correspondence pertaining to membership, including fees and subscriptions, maintenance of records and lists, services to members, preparation of documents and credentials, and liaison between members and the Secretariat in project activities.

Book Reviews

Bordach, J. E., Ryther, J. H. & Mclarney, W. O. (1972): Aquaculture. London: Wiley-Interscience. 868 pp., £15.95

Neither aquaculture nor any other method of food production will be a panacea for human nutritional problems, but all can and must contribute if the spectre of hunger is to be banned. Aquaculture – that is, the growing of aquatic organisms under controlled conditions – can make a unique contribution to nutrition in many parts of the world by virtue both of its extremely high productivity in many situations, and the fact that aquatic crops are primarily protein crops rather than sources of starchy staple foods.

In this book the authors include biological and ecological considerations of the marine and freshwater organisms which are at present cultured, the present and projected state-of-the-art of their cultivation, and yields, diseases and other problems. It is liberally illustrated with pictures of aquacultural practices around the world, and photographs and line drawings showing technical details. Tables give many details including yields, economics, food requirements and organisms.

The only slight reservation that I have is that it is difficult to imagine that there are many individuals who will need this mass of information between two covers, especially considering the very high price of the book. There seems to be good reason for the publishers to consider splitting it into a number of smaller books dealing with groups of organisms or different geographical areas.

J. Lucas

Player, Ian (1973): The White Rhino Saga. Collins: London. 254 pp., £2.50

In this book Ian Player tells how the white rhinoceroses of the Umfolozi Game Reserve in Zululand, which became too numerous for the small area allocated, were caught and re-distributed in their former habitat, as well as being sent to selected zoos throughout the world. Rhino capture was necessary, in fact, for three reasons. First, it was unwise to have the stocks of rhino all living in one area; secondly, the state-owned land adjoining Umfolozi, and into which the rhinos wandered, was increasingly being occupied by squatters; and thirdly, although Umfolozi was maintained primarily as a white rhino sanctuary the great increase of other game subsequent to the tsetse fly extermination campaigns had reduced the amount of habitat available to them. It is true that extensive cropping of these other animals, including warthog, wildebeest and zebra was carried out, nevertheless the deterioration of soil and vegetation continued.

This then is the story of how the rhinos were chased, drugged, captured, tamed, healed, penned and transported. Success did not come immediately, and animals died. But gradually the primitive (and dangerous) methods were refined, until by 1965 IUCN was able to take the white rhino off its red sheet in the Red Data Book.

J. Lucas

Schaller, G. B. (1972): Serengeti, A Kingdom of Predators. New York: Alfred A. Knopf. London: Collins. 116 pp., $US 12.95; £4.00

Collections of wild animal photographs bundled together with an indifferent text of speculation and anecdote are familiar enough. Although "Serengeti, A Kingdom of Predators" devotes more space to illustration than to text, it is far removed from anything in that category. And it should not be regarded as a popular version of the author's "The Serengeti Lion", though there is little prospect of its being regarded as a poor relative of the latter. It is, indeed, a coffee-table book but the text is both readable and factual; detailed analyses of data have been excluded, the author providing instead ample support for his statements by statistics and specific examples of individual forms of behaviour from his field notes, collected during three and a half years in the study area. The illustrations (there are more than 100 coloured photographs) are breathtaking.

The book comprises a summary of the life cycles and social behaviour of the five principal predators (lion, leopard, cheetah, wild dog and hyena) in the Serengeti National Park, with particular reference to interrelations between the predators and their prey.

The topography, climate and vegetation of the Park form the subjects of the early chapters, which then proceed to discuss population estimates of the large herbivores, species' adaptation to predation pressure, and the differing social organization and hunting methods of the predators. Individual chapters are then devoted to each of the predators. There is some particularly interesting information on daily cycles of activity compiled from continuous daylight observations on individual animals over periods of 20 days or more. The lion is dealt with in more depth than other species, and Dr. Schaller explodes a number of myths and misconceptions on parental care and division of responsibility for the young and the functions of adult males in the family unit.

The conclusions of the final chapter on the effects of predation within the Park are predictable but none the less convincing. The author avoids wild generalizations and invariably supports his contentions with factual evidence from the study. He lays considerable stress on the differing effects of predation on individual species, as a result of varying size, habitat and adaptation of the prey animal and of the coursing or stalking methods of hunting employed by the predator.

There is a short list of books for further reading but, unfortunately, no index.

Colin W. Holloway

Laurie, Alec (1973): The Living Oceans. New York: Doubleday, 187 pp., $US 6.95

This is almost a mini-coffee table book in the Doubleday Nature and Science Library, but this is not to decry it. It is written, I would guess, for anyone having slightly more than just a 'seaside holiday' interest in the seas, but although the text is clear and fascinating (and incidentally printed in a type-size which brings welcome relief to this long-sighted reviewer) it is the illustrations which are such a joy. Almost inevitably there are photographs that have been used before, but most are new and some especially striking. However, it is in the line drawings and diagrams that the book really excels, colours are used with gay abandon, and really do help to sort out density or temperature layers in the sea, or the movements of the plankton of the deep scattering layer.

Perhaps unusual for a book published in the United States, the examples are drawn from all over the world, and the United Kingdom is not omitted. This is explained by the fact that the author graduated from Cambridge in 1928, then made three journeys to the Antarctic as a biologist and chemist before assisting in the oceanographic survey of the West Coast of South America.

J. Lucas

Bustard, R. (1972): Sea Turtles: Their natural history and conservation. London: Collins. 220 pp., £3.00

This book, by a member of IUCN's SSC Marine Turtle Group, is divided into four sections. The first deals with general turtle biology and then goes on to discuss the seven species in some detail, finally ending with an account of the coral cays on which species living in the Indo-Pacific region breed. The second section "The lives of turtles" deals almost exclusively with the small but vitally important segment of the turtles' lives spent ashore, for the good reason that we do not know very much about their oceanic life. Nesting behaviour is given for the green turtle, for it is the species most likely to be encountered; but to give an idea of the variations exhibited by the other species, a brief account of that of the loggerhead is also given. The flatback turtle gets a chapter to itself because it is the least-known, but one which Dr. Bustard and his colleagues have studied for some while.

The third section is devoted to research on turtles, beginning with that on eggs and young, and then proceeding to a lengthy description of the research being carried out on Heron Island, off the Queensland coast, by Dr. Bustard and his colleagues. Much of the work has dealt with population ecology, including migration patterns, age/growth relationships, and egg production.

Section four consists of a single chapter, of some 50 pages, entitled "Conservation". It brings together many facets of sea-turtle conservation, past, present and future; reviews old and new legislation, and discusses the relevance of turtle farming to turtle conservation. For readers of the IUCN Bulletin, particular interest arises from the results which have followed IUCN's efforts in this field.

The book concludes with a bibliography and index.

J. Lucas

Van den Brink, F. H. (1972): Die Säugetiere Europas. Hamburg: Paul Parey. 217 pp., DM 34

This revised edition, translated from the original Dutch "Zoogdierengids" by Dr. T. Haltenorth, of the Zoologische Sammlung des Bayerischen Staates, München, follows the system devised by Roger Tory Peterson for the identification of birds. The distribution maps have been brought up to date, in line with modern findings, and the text gives, as before, the information necessary to identify each species or subspecies.

J. Lucas

Other Books Received

Gillett, J. D. (1972): The Mosquito. New York: Doubleday. 358 pp., $US 9.95

Ross-Macdonald, M. (1972): The World Wildlife Guide. New York: Viking Press. 416 pp., $US 8.95]

Edwards, E. P. (1972): A field guide to the birds of Mexico. Sweet Briar, Virginia: E. P. Edwards. 300 pp., $US 8.50]

Kay, D. A. & Skolnikoff, E. B. (eds.) (1972): World eco-crisis. Madison: University of Wisconsin Press. 324 pp., £6.00 (cloth); £1.25 (paper)

National Parks and landmarks (1972). Washington: Dept. of the Interior. 192 pp., $US 0.75

Dasmann, R. F. (1972): Environmental Conservation (3rd ed.): London: John Wiley. 473 pp., £4.50 (cloth); £3.00 (paper)

Yellowstone wildlife (1972). Washington: Dept. of the Interior. $US 0.45

Forrer, Eric (1973): From the nets of a Salmon fisherman. New York: Doubleday. 158 pp., $US 2.95